

inter-observer variability compared to post-operative radiosurgery.

Methods and Materials: We identified 10 consecutive patients, with solitary brain metastasis, treated with post-operative cavity radiosurgery. Pre- and post-operative axial T1 contrast MRI were co-registered with the planning CT scans. Three radiation oncologists independently contoured the target volumes on the pre- and post-operative imaging and CyberKnife treatment plans were generated. The following parameters were evaluated in the two plans: Mean target volume (cc), 50% isodose volume(cc), Inter-observer variability (Jaccard Index JI) and Conformity Index (CI). Results were analyzed with STATA version 14.

Results: Radiosurgery doses ranged from 18 Gy in 1 to 30 Gy in 5 fractions depending on the location and volume (Median 24 Gy in 3 fractions). There was no significant difference in the mean target volume, nor 50% isodose volume, between pre- and post-operative strategies. (17.6 +- SD 12.3 versus 19.4+-15 cc, $p = 0.80$; 61.7 +-37.7 versus 77.7 +- 69.0 cc, $p = 0.65$). There was significantly less inter-observer variability and improved conformity in the pre-operative group (Mean JI 0.84+-0.04 versus 0.70+-0.13, $p = 0.005$; Mean CI 1.32 +- 0.09 versus 1.45 +-0.14, $p = 0.01$). Planned subgroup analysis did not reveal any significant difference (between pre- versus post-op) in the mean volume of cystic versus non-cystic metastasis. Deep lesions (> 2.5 cm from dura) had a larger post-operative target volume (25.8+-17.3 versus 12.3+-9.3 cc, $p = 0.06$) compared to superficial lesions.

Conclusions: Pre-operative radiosurgery has less inter-observer variability and improved plan conformity. However, there was no difference in mean target volume between the pre- versus post-operative radiation. Contouring guidelines, and peer review, may help to reduce inter-observer variability for cavity radiosurgery.

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POPULATION-BASED ANALYSIS OF STEREOTACTIC BODY RADIOTHERAPY (SBRT) FOR OLIGOMETASTATIC LYMPH NODE METASTASES

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Purpose: In the setting of limited metastatic burden of disease, stereotactic body radiotherapy (SBRT) has been shown to achieve high local control rates. It has been hypothesized that SBRT may translate to better quality of life by delaying the need for systemic chemotherapy and possibly increased survival. There is limited published literature on the efficacy of SBRT in limited nodal metastases. The primary objective is to report the clinical outcome of SBRT in a series of patients with either solitary or oligometastases from various tumours to lymph nodes.

Methods and Materials: A retrospective study of patients treated on a provincial protocol with SBRT to metastatic lymph nodes (March 2010 and June 2015) was conducted. Primary endpoint was local control (LC) and chemotherapy free survival following SBRT. Secondary endpoints included toxicities, progression-free survival (PFS), and overall survival (OS).

Results: Eighteen patients underwent SBRT to a metastatic lymph node with a mean age of 61.8 years (range: 20-84 years) and a median follow up of 22 months. There were four (22%) liver, seven (39%) colorectal, four (22%) pancreatic, one (6%) esophageal, one (6%) gallbladder and one (6%) lung primary. Eleven (61%) patients had lymph node metastases as part of their initial presentation of metastatic disease. Seven patients (39%) had systemic therapy prior to SBRT, with the majority of patients (71%) receiving two lines of chemotherapy. Eight patients had solitary metastatic disease at the time of SBRT, with all patients having four or fewer total sites of metastases. Average size of the lymph node metastases was 2.3 cm (range: 0.8-6.2 cm). RT doses were 31 to 60 Gy in four to ten fractions, with 44% of patients receiving 35 Gy in 5 fractions. At one year, LC was 93% and chemotherapy-free survival from the time of SBRT was 58%. PFS at one and two years were 42% and 18% respectively. One and two year OS were 92% and 84%. There were no Grade 3 or higher toxicities reported. On univariate analysis, absence of prior chemotherapy and non-colorectal primary approached

significance for improved local control (both $p = 0.052$) while solitary metastases was associated with improved PFS ($p = 0.029$) and trended to improved chemotherapy-free survival ($p = 0.066$).

Conclusions: In this single institution study, SBRT to oligometastatic lymph nodes provides high local control and a moderate chemotherapy-free interval with acceptable toxicities. Progression of disease remains prominent in these patients. Larger cohort studies are required to better identify a subset of patients with oligometastatic nodal disease who benefit the most from SBRT.

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LONG-TERM QUALITY OF LIFE OF RETROPERITONEAL SARCOMA PATIENTS TREATED WITH PRE-OPERATIVE RADIOTHERAPY AND SURGERY

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Purpose: The management of retroperitoneal sarcomas (RPS) may include pre-operative radiotherapy (RT) and surgery. As RPS often require multi-visceral resection, combined treatment of RPS can be associated with substantial toxicity as radiation sensitive organs may be affected by pre-op RT. We aimed to examine how these treatments related toxicities affect patient quality of life (QOL).

Methods and Materials: In a cross-sectional study, 25 primary RPS patients treated with pre-operative IMRT from 2004-2012 were recruited and assessed for QOL (EORTC QLQ-C30) and to determine RT and surgery related toxicities (CTCAE V.4). Baseline and prospective QOL was available for 11 patients. In the other 14 patients cross-sectional data alone were obtained at different time points during their follow up (four weeks, six months, one year, three years, five years and 10 years post-IMRT). Unless stated otherwise, all scores refer to the global domain.

Results: Ten female and 15 male patients with a median age of 56 (38-80) were treated with IMRT to a median dose of 50.4 Gy (41.4-50.4). The median maximum dimension was 13.4 cm (5.7-28) and the majority (17/25) were liposarcomas. The median time from completion of RT to RPS surgery was 9.4 weeks (5-17.4). Of the 11 patients who completed baseline QOL assessments, their compliance at four weeks, six months, one year and three years post-RT were 80%, 100%, 90%, and 100%. Mean pre-RT QOL was 48.5 (standard deviation (SD) 19.3). At four weeks post-RT, mean QOL was 57.5 (SD: 23.7) however, the mean diarrhea symptom scale increased from baseline (85 versus 18.1, $p < 0.001$). Correspondingly, 54% of patients had gastrointestinal toxicities (32% G1, 56% G2 and 8% G3) by the end of RT. Regression slope analysis suggested that QOL significantly ($p = 0.002$) improved over the first three years. The number of toxicities was significantly ($p = 0.002$) associated with QOL over time. Clinically important improvement (> 10 points) from baseline was observed at one year (68.6, SD: 18.4). At three years post-RT, 88% of patients had chronic RT and/or surgery related toxicities of which 30% were Grade 3 toxicities. RPS patients who survived at least three years had significantly better QOL (mean: 67.2, $p = 0.007$ Mann-Whitney Test) relative to the full group at diagnosis. QOL changed little (mean: 0.31 point/month; SD: 0.36) after three years ($n = 10$). RT dose, tumour size, patient age and gender were not associated with three year QOL scores.

Conclusions: Treatment toxicities seem to contribute to QOL recovery during the first three years. The number of toxicities a patient had was significantly associated with QOL. Despite patients having on average 2.5 treatment-related chronic toxicities, QOL at three years was better than at diagnosis.